

CLAIMS

1. A method for producing low carbon steel comprising the following sequential refining stages:

(A) providing oxygen in at least one stream enveloped in a gas shroud from a lance to molten steel having a carbon concentration greater than 0.30 weight percent; thereafter

(B) providing oxygen in at least one stream enveloped in a flame shroud from the lance to the molten steel; and thereafter

(C) providing oxygen and inert gas in at least one stream enveloped in a flame shroud from the lance to the molten steel;

said refining stages serving to produce low carbon steel.

2. The method of claim 1 wherein the gas shroud comprises oxygen and nitrogen.

3. The method of claim 1 wherein the gas shroud is provided from the lance through a single ring of ports around a plurality of nozzles.

4. The method of claim 1 wherein the oxygen is provided in a plurality of streams in both stage (A) and stage (B).

5. The method of claim 1 wherein the oxygen and inert gas is provided in a plurality of streams in stage (C).

6. The method of claim 1 wherein the inert gas employed in stage (C) is argon.

7. The method of claim 1 wherein the gas shroud in stage (A) extends from the lance to the molten steel.

8. The method of claim 1 wherein the flame shroud in stage (B) extends from the lance to the molten steel.

9. The method of claim 1 wherein the flame shroud in stage (C) extends from the lance to the molten steel.

10. A method for producing low carbon steel comprising the following sequential refining stages:

(A) providing oxygen in at least one stream enveloped in a gas shroud from a lance to molten steel having a carbon concentration greater than 0.30 weight percent; thereafter

(B) providing oxygen in at least one stream enveloped in a flame shroud from the lance to the molten steel; and thereafter

(C) providing inert gas in at least one stream enveloped in a flame shroud from the lance to the molten steel;

said refining stages serving to produce low carbon steel.

11. The method of claim 10 wherein the gas shroud comprises oxygen and nitrogen.

12. The method of claim 10 wherein the gas shroud is provided from the lance through a single ring of ports around a plurality of nozzles.

13. The method of claim 10 wherein the oxygen is provided in a plurality of streams in both stage (A) and stage (B).

14. The method of claim 10 wherein the inert gas is provided in a plurality of streams in stage (C).

15. The method of claim 10 wherein the inert gas employed in stage (C) is argon.

16. The method of claim 10 wherein the gas shroud in stage (A) extends from the lance to the molten steel.

17. The method of claim 10 wherein the flame shroud in stage (B) extends from the lance to the molten steel.

18. The method of claim 10 wherein the flame shroud in stage (C) extends from the lance to the molten steel.